



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/088,723	07/22/2002	Benoit Couet	US57.0410-W0	6931

7590 02/27/2004

Schlumberger Doll Research
Intellectual Property Law Department
36 Old Quarry Road
Ridgefield, CT 06877

EXAMINER

MILLER, ROSE MARY

ART UNIT	PAPER NUMBER
----------	--------------

2856

DATE MAILED: 02/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/088,723

Applicant(s)

COUET ET AL

Examiner

Rose M Miller

Art Unit

2856

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 November 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-23 and 26-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-23 and 26-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11/5/2003 & 3/19/2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Terminal Disclaimer

1. The terminal disclaimer filed on 5 November 2003 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of copending application 10/088,752 has been reviewed and is accepted. The terminal disclaimer has been recorded.
2. The filing of a terminal disclaimer cannot be conditional. Therefore, the terminal disclaimer has been made part of the permanent record and the portion of any patent granted on this application which would extend beyond the expiration date of a patent resulting from copending application 10/088,752 (should such be patented) is disclaimed.

Priority

3. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. PCT/GB00/04129, filed on 26 October 2000, a copy of which has been forwarded by the International Bureau and placed in this application.

Drawings

4. The drawings are objected to because empty diagram boxes are impermissible under 37 CFR §1.83(a) which recites as follows:

*"The drawing in a nonprovisional application must show every feature of the invention specified in the claims. However, conventional features disclosed in the description and claims, where their detailed illustration is not essential for a proper understanding of the invention, should be illustrated in the drawing in the form of a graphical drawing symbol or a **labeled** representation (e.g., a **labeled** rectangular box)." (Emphasis added by Examiner)*

The empty diagram boxes 11, 91, 714, 722, and 825, found in Figures 1A, 1B, 1C, 1D, 7, 8, 9A, 9B, and 10 of the drawings, must be labeled with an appropriate descriptive phrase in addition to the reference legend already present. Appropriate correction is required.

Art Unit: 2856

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

5. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-2, 4-22, and 25-41 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Independent claims 1, 16, and 34 are indefinite as each utilizes the term "adapted" to describe the "device", "monitor" or "power supply" recited. The term "adapted" means "originally designed for one purpose but modified for another". In as much the Applicant has failed to identify the original purpose or the modification of the recited devices, it is not possible to determine the complete metes and bounds of the claimed invention.

Should the applicant intend the term --for-- such should be made clearer.

Claims 2, 4-15, 17-22, 25-33, and 35-41 are rejected as they fail to correct the problems presented by the independent claims from which they depend.

Claims 9, 12, 19, and 39 also utilize the phrase "adapted" and are indefinite for this reason.

For the purposes of applying art, the claims have been treated as if the phrase "adapted to operate" reads --operating-- and the phrase "adapted to supply" reads --for supplying-- in each of the claims reciting the indefinite phrases. Other phrases utilizing

Art Unit: 2856

the word "adapted" have been taken as though they were a "means plus function" phrase appropriate to the claimed invention.

8. Claims 1, 3-15, and 34-40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 3-15, and 34-40 are rejected as being indefinite as the phrase "said monitor" (found on line 8 of claim 1 and line 10 of claim 34) lacks a proper antecedent basis. The claims previously recite a "deposit monitoring apparatus" and an "acoustic device". There is no specific recitation of the "monitor" being referred to.

Claims 9 and 39 are further rejected as the phrase "said deposit monitor" found on lines 3 and 4, respectively, lack a proper antecedent basis.

Claims 3-8, 10-15, 35-38, and 40 are rejected as they fail to correct the problems presented by the claim from which they depend.

9. Claim 15 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 15 is rejected as being indefinite as claim 1, from which claim 15 depends, fails to provide a proper antecedent basis for the phrase "the sensor", found on line 1 of claim 15.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2856

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 16-20, 23, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kraus et al. (US 5,734,098)** in view of “**On-site, Near-Real-Time Monitoring of Scale Deposition**” by **D.H. Emmons, G.C. Graham, S.P. Holt and M.M. Jordan** (hereafter referred to as **Emmons et al.**) and **Edgerton (US 4,092,858)**.

Kraus et al. discloses a monitor to measure characteristics of fluids in an environment located above ground, the monitor having a monitoring surface that is directly exposed to fluids and a power supply for supplying electrical energy to said monitor, the monitor being part of a control loop for controlling the deposits in a system (see column 5 lines 5 to 48).

Kraus et al. discloses the claimed invention with the exception of a deposit removal system including an acoustic device exerting a physical force on the monitoring surface to at least partially remove a deposition of material from the monitoring surface.

Emmons et al. enhances the teachings of **Kraus et al.** by teaching at column 1, paragraph 4, of page 392 the utilization of a thickness shear mode resonator to monitor deposits in “surface equipment” in order to automate chemical feed and immediate recognition of caused by process changes.

As to the invention including a deposit removal system including an acoustic device exerting a physical force on the monitoring surface to at least partially remove a deposition of material from the monitoring surface, **Edgerton** teaches the ultrasonic cleaning of an acoustic sensor and the surfaces of the acoustic sensor exposed to a particular environment. Therefore, it would have been obvious to one of ordinary skill in

Art Unit: 2856

the art at the time the invention was made to modify the sensor of **Kraus et al.** in view of **Emmons et al.** to provide for the cleaning of a sensor found within the system as **Edgerton** clearly teaches that such cleaning provides for a better operation of the sensor and prolongs the life of the sensor.

With regards to claim 17, both **Kraus et al.** and **Emmons et al.** teach testing fluids that are primarily fluids produced by hydrocarbon wellbores.

With regards to claim 18, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the monitoring surface on or near one of switches, valves, sleeves, mandrels, risers, subsea pipelines, downhole separators, and sensors located on surface facilities as it is well known throughout the art of wellbore monitoring that such devices are prone to scaling and that the scaling affects the operation of each one of the recited devices. As taught by **Emmons et al.**, the goal is better management of scale resulting in lowered operating costs. Therefore, one of ordinary skill in the art would want to monitor the scaling around the particular device in order to prolong the life of the device by not damaging the device due to the presence of excessive scaling or to compensate for the scaling present (as would be necessary should the scaling affect the output of the sensors claimed). Such actions would prolong the life of the equipment found within the wellbore and thereby lower the operating costs for the wellbore.

With regards to claim 19, **Kraus et al.** clearly discloses the monitor comprising an acoustic device operating in a resonance mode and the monitor measures deposition of material on the monitoring surface by measuring a change in resonance frequency of the acoustic device of the monitor.

With regards to claim 20, **Kraus et al.** discloses using a thickness-shear mode resonator to monitor mass deposition. **Kraus et al.** discloses at column 3 line 57 - column 4 line 7 that the thickness-shear mode resonator operates by applying an oscillating electric field across the thickness of the quartz crystal. This produces a standing shear wave across the thickness of the plate (resonance state of the acoustic device, see **Granstaff et al.** column 1 lines 18-29 and column 3 lines 39-44 for more information, **Granstaff et al.** fully incorporated by reference into **Kraus et al.**). This

Art Unit: 2856

results in the surface exposed to the fluid environment moving predominately normal to itself. As Applicant has defined the "longitudinal mode" of the acoustic device used in the invention as "the surface of the device exposed to the fluid is move predominantly normal rather than parallel to the exposed surface" (see last paragraph of page 15 and first paragraph of page 16 of the specification), the acoustic device of **Kraus et al.** meets the definition of Applicant's "longitudinal mode". Therefore, the device of **Kraus et al.** operates in a "longitudinal mode" as defined by Applicant.

With regards to claim 23, **Kraus et al.** discloses using a deposition inhibiting or removing chemical agent as part of a deposit removal system (see column 5 lines 5-48).

With regards to claim 26, **Kraus et al.** discloses the monitor being selected from the group of optical sensors, electro-chemical sensors, or acoustic sensors (**Kraus et al.** discloses utilizing an acoustic sensor).

13. Claims 34-35 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kraus et al.** in view of **Emmons et al.**

Kraus et al. discloses a deposit monitoring apparatus located above ground comprising an acoustic device (thickness shear mode resonator) operating in a resonance mode including a monitoring surface directly exposed to fluids produced by a hydrocarbon wellbore, wherein the deposition of material on the monitoring surface is monitored by measuring a change in resonance frequency of the acoustic device and a power supply supplying said acoustic device with electrical energy.

With regards to claim 34, **Kraus et al.** discloses the claimed invention with the exception of specifically measuring the difference between a deposit of 600 microns from a deposit of 1050 microns. The system of **Kraus et al.** can easily distinguish between layers of deposits of the recited thicknesses, as the system of **Kraus et al.** is dependant upon the amount of mass deposited, not the thickness of the layer. The difference in the two layers is sufficient to alter the resonance of the resonator of **Kraus et al.** as long as the mass of the layers is sufficient to alter the resonance. **Emmons et al.** teaches that the sensor can detect nanograms of deposit. It is only when the weight of the deposited layer becomes too great that the sensor is overloaded that results in

Art Unit: 2856

the sensor being unable to distinguish such small differences. As Applicant has not claimed a particular mass which would overload the system of **Kraus et al.**, the system of **Kraus et al.**, in view of the teachings of **Emmons et al.**, discloses the claimed invention.

With regards to claim 35, **Kraus et al.** discloses using a thickness-shear mode resonator to monitor mass deposition. **Kraus et al.** discloses at column 3 line 57 - column 4 line 7 that the thickness-shear mode resonator operates by applying an oscillating electric field across the thickness of the quartz crystal. This produces a standing shear wave across the thickness of the plate (resonance state of the acoustic device, see **Granstaff et al.** column 1 lines 18-29 and column 3 lines 39-44 for more information, **Granstaff et al.** fully incorporated by reference into **Kraus et al.**). This results in the surface exposed to the fluid environment moving predominately normal to itself. As Applicant has defined the "longitudinal mode" of the acoustic device used in the invention as "the surface of the device exposed to the fluid is move predominantly normal rather than parallel to the exposed surface" (see last paragraph of page 15 and first paragraph of page 16 of the specification), the acoustic device of **Kraus et al.** meets the definition of Applicant's "longitudinal mode". Therefore, the device of **Kraus et al.** operates in a "longitudinal mode" as defined by Applicant.

With regards to claim 38, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the monitoring surface on or near one of switches, valves, sleeves, mandrels, downhole separators, and sensors located within the wellbore as is well known throughout the art of wellbore monitoring that such devices are prone to scaling and that the scaling affects the operation of each one of the recited devices. As taught by **Emmons et al.**, the goal is better management of scale resulting in lowered operating costs. Therefore, one of ordinary skill in the art would want to monitor the scaling around the particular device in order to prolong the life of the device by not damaging the device due to the presence of excessive scaling or to compensate for the scaling present (as would be necessary should the scaling affect the output of the sensors claimed). Such actions would prolong the life of the

Art Unit: 2856

equipment found within the wellbore and thereby lower the operating costs for the wellbore.

14. Claims 39-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kraus et al.** in view of **Emmons et al.** as applied to claim 34 above, and further in view of **Edgerton**

With regards to claim 39, **Kraus et al.** in view of **Emmons et al.** discloses the claimed invention with the exception of the deposit removal system using the acoustic device to exert a physical force onto the deposited material. **Edgerton** teaches using an acoustic device to exert a physical force (vibration) onto deposited material in order to remove the deposited material, the removal of such deposits known in the prior art as utilizing "ultrasonic cleaning" to remove unwanted deposits from surfaces. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the system of **Kraus et al.** in view of **Emmons et al.** with a means to physically remove the unwanted deposits as **Edgerton** teaches the principles of ultrasonic cleaning in order to keep a sensor body free of deposits which would inhibit the operation of the sensor.

With regards to claim 40, **Kraus et al.** in view of **Emmons et al.** discloses the claimed invention with the exception of the deposit removal system being near a sensor. **Edgerton** teaches the ultrasonic cleaning of an acoustic sensor and the surfaces of the acoustic sensor exposed to a particular environment. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify **Kraus et al.** in view of **Emmons et al.** to provide for the cleaning of a sensor found within the system as **Edgerton** clearly teaches that such cleaning provides for a better operation of the sensor and prolongs the life of the sensor.

Allowable Subject Matter

15. Claims 1 and 3-15 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

Art Unit: 2856

16. Claims 27-33, and 36-37 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Marsh et al. (US 3,056,284) discloses a scale and corrosion measuring device and method.

Mansure et al. (US 5,827,952) discloses a method and apparatus for determining deposition-point temperature.

Johnson (US 6,131,659) discloses a downhole well corrosion monitoring apparatus and method.

Vig et al. (US 6,247,354 B1) discloses techniques for sensing the properties of fluids with resonators.

Sinha (US 6,286,370 B1) discloses a method using ultrasound for detecting materials on metal surfaces.

Atherton (US 2003/0101822 A1) discloses a sensor apparatus for use in downhole applications.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rose M Miller whose telephone number is 571-272-2199. The examiner can normally be reached on Monday - Friday, 7:30 am to 3:30 pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on 571-272-2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2856

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RMM

5 February 2004


HEZRON WILLIAMS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800